REMARKS / ARGUMENTS

Status of Claims

Claims 1-3, 5-11, 13-17, and 21-31 are pending in the application, and stand rejected. Of the pending claims, Applicant herein provides clarifying remarks, for consideration by the Examiner, to traverse the rejections. No claim amendments have been made, and therefore under 37 CFR 1.121, no claim listing is provided herewith.

Applicant respectfully submits that the rejections under 35 U.S.C. §102(e) and 35 U.S.C. §103(a) have been traversed, that no new matter has been entered, and that the application is in condition for allowance.

Regarding Examiner's "Response to Arguments"

At the outset, Applicant notes that the Examiner in the instant Office Action repeats verbatim the rejections recorded in the Office Action dated April 6, 2007, with the exception of the rejections to Claims 30 and 31 noted on pages 5 and 6, and with the exception of the Examiner's "Response to Arguments" provided on pages 2-3. As such, Applicant first addresses the Examiner's "Response to Arguments".

There are several areas where Applicant respectfully disagrees with the Examiner.

I: With regard to Examiner's paragraph 1, it appears that the Examiner is totally disregarding the limitation of independent Claims 1, 9, 15, 21 and 24 directed to "the ***axial direction being defined by*** the direction of motion of a movable table for receiving the patient thereon". On page 2 of the instant office action, the Examiner states: "Applicant has chosen to define the axial direction as the direction of motion of a movable table, the motion of that table of course being into the machine for imaging. Based on that *assumption* of axis, a subdivision of elements, namely pixels or voxels would then be defined. Axes are arbitrary, and simple coordinate shifts [that] can be used to perform any mathematical operation in one coordinate system with respect to any other, **which fails to further limit the claims of record.**" (italicized emphasis in the original, boldface emphasis added). In view of this "assumption", which Applicant

submits is totally inapposite with respect to the very language of the claimed invention, it appears that the Examiner is equating pixels or voxels with the claimed sub-target area, which is a subdivision of the target area in the axial direction, not a subset of the target area within a single 2D image of the target area. Applicant respectfully disagrees with the Examiner's "assumption", and submits that such an "assumption" is inappropriate for purposes of anticipation.

As claimed, Applicant is establishing a specific direction in which a particular process is performed. For example, subsequent to defining the axial direction, Claim 1 recites "...processing said target area by subdividing said target area ***in the axial direction*** into multiples of an increment of the overall detector coverage in the axial direction so as to create a plurality of sub-target areas of interest...". Here, Applicant is not merely subdividing the target area in just any arbitrary direction, but is specifically subdividing the target area ***in a defined axial direction***, and is subdividing the target area into multiples of an increment of the overall detector coverage ***in the axial direction*** so as to create a plurality of sub-target areas of interest. As such, the target area that is projected along the axial direction is subdivided into multiple sub-target areas in the axial direction, which is not an arbitrary subdivision in an arbitrary direction.

Additionally, in alleging anticipation of the claimed invention, the Examiner broadly concludes that "axes are arbitrary" (even though Applicant specifically calls for the claimed axial direction to be defined by the ***non-arbitrary*** direction of motion of the movable table for receiving the patient thereon, where the direction of motion of the movable table for receiving the patient thereon is toward the imaging apparatus), and that such a limitation "fails to further limit the claims of record" (even though the claimed axial direction being defined by the direction of motion of the movable table for receiving the patient thereon ***does not include a direction perpendicular to*** the direction of motion of the movable table for receiving the patient thereon, and therefore must be limiting).

In broadly concluding that "axes are arbitrary" and that the claimed limitation "fails to further limit the claims of record", it appears to Applicant that the Examiner is totally and completely impermissibly excluding an essential element of the claimed

invention, for without this axial direction being defined, the claimed limitation of ***subdividing the target area in the axial direction*** into multiples of an increment of the overall detector coverage in the axial direction so as to create a plurality of sub-target areas of interest, would have no meaning.

It appears to Applicant that the Examiner would like to conclude that the aforementioned limitation has no meaning so that Examiner can further conclude that the axial direction being defined by the direction of motion of the movable table is no different than the axial direction being defined by an arbitrary direction across a 2D image, thereby resulting in a final conclusory allegation that a sub-set of pixels within a 2D image of pixels is anticipatory of the claimed sub-target areas of interest.

Applicant wholeheartedly disagrees.

A defined direction of the claimed axial direction cannot be arbitrary if it is defined, and a plurality of sub-target areas of interest along the axial direction (not along an arbitrary direction across a 2D image) cannot be the same as a sub-set of pixels within an image if the sub-target area is not defined to exist in a 2D plane, but is rather defined to span a spatial distance along an axial direction defined by the direction of motion of a movable table for receiving the patient thereon.

Accordingly, Applicant respectfully submits that the Examiner has fallen wholly short of showing where Barni clearly discloses each and every element of the claimed invention arranged as claimed.

II: With regard to Examiner's paragraph 3, the Examiner disagrees that "an area of detection capability", which Applicant understands to be directed to the claim limitation "multiples of an increment of the overall detector coverage in the axial direction", limits the physical size of the sub-target areas being examined.

Applicant respectfully disagrees.

If the aforementioned claim limitation did nothing to limit the physical size of the sub-target areas being examined, then each sub-target area could be as large as the target area, which cannot be because Applicant clearly limits the physical size of the sub-target areas to be smaller than the target area, for it is the target area that is being subdivided in

the axial direction into multiples of an increment of the overall detector coverage in the axial direction so as to create a plurality of sub-target areas of interest. From the foregoing, it is clearly evident that "multiples of an increment of the overall detector coverage in the axial direction" limits the size of each sub-target area to be less than the target area.

Accordingly, Applicant respectfully submits that the Examiner has fallen wholly short of showing where Barni clearly discloses each and every element of the claimed invention arranged as claimed.

III: With regard to Examiner's paragraph 4, the Examiner alleges anticipation of "...processing said image data to determine a phase of said image data; synchronizing said image data; and combining said synchronized image data for each of said sub-target areas to create a set of image data of the target area of interest" (Claim 1), is provided by Barni at col. 4, lines 25-42.

Applicant respectfully disagrees.

At col. 4, lines 25-42, Applicant finds Barni to disclose "an appropriate gating technique may be used to achieve the first temporal resolution when the offending biological function or movement is cyclical in nature. For example, in prospective applications, the gating is used to trigger data acquisition by the imaging apparatus 12 ***at the same point*** in each of a series of consecutive cycles until enough data is acquired to complete the reconstruction."

Here, Applicant finds Barni to disclose and teach a gating technique to achieve a first temporal resolution (not a combination of synchronized image data ***for each of the sub-target areas***) that uses gating to trigger data acquisition ***at the same point*** in each of a series of consecutive cycles (the same point in each of a series of consecutive cycles is substantially different from combining the synchronized image data for each of the sub-target areas).

In comparing Barni with the claimed invention, Applicant submits that ***different sub-target areas are not the same as "same point"***.

Accordingly, Applicant respectfully submits that the Examiner has fallen wholly short of showing where Barni clearly discloses each and every element of the claimed invention arranged as claimed.

IV: With regard to Examiner's paragraph 5 (referencing Claim 29), the Examiner alleges that "the use of picture elements which are of the same size, shape and dimension discloses the claim ***substantially***" (emphasis added).

Applicant respectfully disagrees.

Claim 29 recites, inter alia, "wherein each increment of the multiples of an increment are equally dimensioned." Here, Applicant is not referring to just any multiples of an increment, but rather is specifically referring to the target area being subdivided in the axial direction into multiples of an increment of the overall detector coverage in the axial direction so as to create a plurality of sub-target areas of interest. As such, it is the sub-target areas of interest subdivided in the axial direction that are equally dimensioned with respect to an incremental dimension in the axial direction.

By stating that the claimed limitation is ***substantially*** disclosed, it is unclear to Applicant exactly what the Examiner is saying that Barni ***actually*** discloses, and Applicant submits that Barni is absent any disclosure of a target area being subdivided in the axial direction into multiples of an increment of the overall detector coverage in the axial direction so as to create a plurality of sub-target areas of interest.

Furthermore, Applicant submits that a rejection based on a "***substantial***" disclosure is wholly insufficient for an anticipatory rejection, which must be based on a showing of each and every element arranged as claimed in a single prior art reference.

Accordingly, Applicant respectfully submits that the Examiner has fallen wholly short of showing where Barni clearly discloses each and every element of the claimed invention arranged as claimed.

In addition to the foregoing, and in alleging anticipation under 35 USC §102(e), the Examiner alleges that Barni discloses each and every element of Claim 1, but fails to state where in Barni the limitation of "operating said imaging system to create image data

responsive to ***each said sub-target area***" can be found, where each sub-target area is part of a plurality of sub-target areas having been subdivided from a target area in the defined axial direction.

Accordingly, Applicant respectfully submits that the Examiner has fallen wholly short of showing where Barni clearly discloses each and every element of the claimed invention arranged as claimed.

Furthermore, in alleging anticipation of Claim 1, the Examiner alleges that Barni discloses "processing the target area to create a plurality of sub-target areas of interest (col. 3,lines 51-54)".

Applicant respectfully disagrees that Barni discloses all that the Examiner alleges.

In comparing Barni with the claimed invention, Applicant finds Barni to disclose "at least two medical images ***of the same region of interest*** are obtained, one at a relatively ***higher temporal resolution***... and the other at a relatively ***lower temporal resolution***... Each of the first and second images are preferably loaded into memories 16a and 16b, respectively, as an array or matrix of image data" (col. 3, lines 40-54) (emphasis added).

Here, Applicant finds the first and second images not to be different sub-target areas resulting from the subdivision of a target area in the defined axial direction, but to be first and second images ***of the same region of interest***, but at ***different temporal resolutions***. As such, Applicant submits that different temporal resolutions ***of the same region*** is substantially different from ***different sub-target areas*** along an axial direction.

Accordingly, Applicant respectfully submits that the Examiner has fallen wholly short of showing where Barni clearly discloses each and every element of the claimed invention arranged as claimed.

Regarding the Rejections Under 35 U.S.C. §102(e)

As previously stated, Applicant notes that the Examiner in the instant Office Action repeats verbatim the rejections recorded in the Office Action dated April 6, 2007,

with the exception of the rejections to Claims 30 and 31 noted on pages 5 and 6, and with the exception of the Examiner's "Response to Arguments" provided on pages 2-3. As such, Applicant repeats below the arguments made in the Amendment paper filed July 3, 2007, which Applicant submits remain relevant to the present rejections.

Rejections Under 35 U.S.C. §102(e)

Claims 1, 3, 6, 7, 9, 11, 13-15, 21, 24, 26, 27 and 29-31 stand rejected under 35 U.S.C. §102(e) as being anticipated by Barni. (U.S. Patent No. 6,473,634, hereinafter "Barni").

Applicant traverses these rejections for the following reasons.

Applicant respectfully submits that "[a] claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, ***in a single prior art reference***." *Verdegaal Bros. V. Union Oil Co. of California*, 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987) (emphasis added). Moreover, "[t]he identical invention must be shown in as complete detail as is contained in the *** claim." *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, 9 USPQ2d 1913, 1920 (Fed. Cir. 1989). Furthermore, the single source must disclose all of the claimed elements "arranged as in the claim." Structural Rubber Prods. Co. v. Park Rubber Co., 749 F.2d 707, 716, 223 U.S.P.Q. 1264, 1271 (Fed. Cir. 1984). Missing elements may not be supplied by the knowledge of one skilled in the art or the disclosure of another reference. Titanium Metals Corp. v. Banner, 778 F.2d 775, 780, 227 U.S.P.Q. 773, 777 (Fed. Cir. 1985).

Dependent claims inherit all of the limitations of the respective parent claim.

Regarding Independent Claim 1

Applicant has amended Claim 1 to now recite, inter alia,

"*...an axial direction, the axial direction being defined by the direction of motion of a movable table for receiving the patient thereon, the method comprising: determining a target area of interest ...*"

No new matter has been added by this amendment as antecedent support may be found in the application as originally filed, such as at paragraphs [0028]-[0030] and [0045], for example.

To allege anticipation of the claimed "...*processing said target area by* ***subdividing said target area in the axial direction*** into ***multiples of an increment of the overall detector coverage in the axial direction so as to create a plurality of sub-target areas of interest***..." by Barni, the Examiner looks to col. 3, lines 51 –54 and states "...it would be anticipated and reasonable ***to assume*** that a defined direction chosen by Barni for the ***subdivision of the image*** would have been an axial direction." (emphasis added) [paper 20070323, page 4.]

Applicant respectfully disagrees that Barni anticipates Claim 1 for at least the following reasons.

First, Applicant respectfully submits that it appears that the Examiner is relying upon ***an assumption of*** the knowledge of one skilled in the art to supply claim elements that Barni fails to disclose. Applicant submits that such reliance does not support a rejection under 35 U.S.C. §102, which requires disclosure of each and every claim element arranged as claimed. Specifically, Applicant submits that Barni is absent any disclosure of the claimed "...***subdividing said target area in the axial direction***...", and more specifically is absent disclosure of the amended claim language directed to "***the axial direction being defined by the direction of motion of a movable table for receiving the patient thereon***".

Second, while Applicant agrees with Examiner's characterization of a pixel within the context of imaging as "the smallest chosen ***portion of an image***, organized for processing" (emphasis added)[paper 20070323, page 3], Applicant respectfully disagrees that the Examiner's characterization of Barni:"...inherent within pixelation as an imaging technique is that ***any image which has been pixilated*** is ready for immediate 'sub-target area' analysis..." (emphasis added) [paper 20070323, page 3] discloses the claimed *processing said* ***target area*** *by subdividing said* ***target area***, because the claimed ***target area*** (as well as the claimed *sub-target area*) are neither an ***image*** nor ***image data***.

Applicant finds Barni to disclose "...***first and second images*** are preferably loaded into memories 16a and 16b, respectively, as an ***array or matrix of image data***, e.g. pixel data or voxel data..." (emphasis added) [Barni, col. 3, lines 51-54].

In comparing the disclosure of Barni with the claimed invention, Applicant respectfully submits that Barni discloses processing of ***image data*** by loading the image data into a storage memory. In stark contrast, the claimed ***target area*** (and ***sub-target area***) are distinguished from ***image data*** as exemplified by the claimed "...***obtaining*** scout ***image data responsive to said target area***..." and "...operating said imaging system ***to create image data*** *responsive to each said* ***sub-target area***...". Accordingly, Applicant respectfully submits that Barni is absent disclosure of the claimed "...*processing* ***said target area*** *by* ***subdividing said target area***..."

Third, Applicant respectfully disagrees with the Examiner's assertion (on pages 2 and 3 of the present paper) that Applicant's definition of "detector coverage" lacks description of a specific size or shape. Applicant respectfully submits that paragraph [0045] of the detailed description (as referred to by the Examiner) provides specific and exemplary description of detector coverage: "...the area of interest is subdivided in the Z-axis (in this embodiment the patient table direction) into multiples of ***detector coverage*** in Z. For example, if there is 6cm of the area of interest in the Z direction, and the ***detector coverage in that axis is only 2cm***, data is acquired with 3 consecutive locations, with each location covering 2cm". Applicant respectfully submits that one having ordinary skill in the art of medical imaging would understand from such description that "detector coverage" describes an area of coverage (detection capability) within a direction of interest. Furthermore, Applicant respectfully submits that the example provided within the detailed description would enable such person of ordinary skill in the art to recognize and understand the use of *detector coverage* in the claimed ***subdividing the target area in the axial direction into multiples of an increment of the overall detector coverage in the axial direction***.

Furthermore, Applicant has amended Claim 1 to now claim "...*processing said image data to determine a phase of said image data; synchronizing said image data; and*

combining ***said*** ***synchronized image data*** ***for*** ***each*** ***of said*** ***sub-target areas*** *to create a set of image data of the target area of interest...*"

No new matter has been added by this amendment as antecedent support may be found in the specification as originally filed, such as at Paragraph [0047] for example.

Applicant finds Barni to disclose "...at least two medical images ***of the same region*** of interest are obtained, one at a relatively higher temporal resolution (see, e.g., FIG. 2) and the other at a relatively lower temporal resolution (see, e.g., FIG. 3)...an appropriate gating technique...to achieve the first temporal resolution [of ***the first image***, wherein] ...data is repeatedly captured at the same relative time...[and] corresponds to **a selected phase.** ...***As opposed to the first temporal resolution***, the second temporal resolution [of ***the second image***] is low, preferably low enough to capture the blurring caused by movement of the tissue...the blurred image 202 represents the range of motion...An image combiner ***superimposes*** the ***aligned first and second medical images*** over one another" (emphasis and clarification added) [Barni: col. 3, lines 40-42; col. 4, lines 25-65; col. 5, lines 60-62].

Applicant submits that Barni discloses ***synchronizing image data*** to obtain ***a first image*** of ***a target area*** that includes image data corresponding to a single phase, obtaining ***a second image*** of ***the same target*** area that includes image data corresponding to a ***plurality of phases*** (to represent the range of motion), and ***combining*** (superimposing) ***the first and second (and thereby unsynchronized)*** images *(which include a plurality of phases)* of ***the same target area.***

Applicant respectfully submits that Barni is absent the now claimed "*...processing said image data to determine a phase of said image data; synchronizing said image data; and* ***combining*** ***said*** ***synchronized*** ***image data for each of*** ***said sub-target areas*** *to create a set of image data of the target area of interest...*".

Stated alternatively, Applicant submits that Barni discloses a method of spatially ***aligning*** and ***superimposing*** two images of **the same target area** that include a plurality ***of temporal phases*** of tissue motion, which Applicant further submits is substantially different from the claimed ***combining*** ***synchronized*** image data of a plurality of ***different***

sub-target areas to create a set of image data corresponding to a larger target area of interest.

In view of all of the foregoing, Applicant submits that Barni does not disclose each and every element of the claimed invention arranged as in the claim, and absent anticipatory disclosure in Barni of each and every element of the claimed invention arranged as in the claim, Barni cannot be anticipatory.

Regarding Independent Claims 9, 15, 21, and 24

Applicant has incorporated amendments similar to those presented above in Claim 1 into Independent Claims 9, 15, 21, and 24. Applicant respectfully submits that for at least the same reasons set forth above with respect to Independent Claim 1, Barni fails to disclose each and every element of Independent Claims 9, 15, 21, and 24 arranged as claimed.

Accordingly, Applicant submits that Barni does not disclose each and every element of the claimed invention arranged as in the claim, and absent anticipatory disclosure in Barni of each and every element of the claimed invention arranged as in the claim, Barni cannot be anticipatory.

Regarding Claim 29

To allege anticipation of Claim 29, the Examiner appears to provide only a restatement of the claim language, and a remark of "2d, 3d, as per Col 3-4". Applicant respectfully submits that the above remark appears to be merely a broad, conclusory restatement of the claim language, absent specific recitation of where each and every element of the claimed invention may be found within Barni.

Specifically, Applicant respectfully submits that Barni is absent any disclosure of the Claimed "...*wherein each increment of the multiples of an increment* [of the overall detector coverage in the axial direction] *are equally dimensioned*..." which is specifically claimed for in the instant invention.

Accordingly, Applicant respectfully submits that a broad, conclusory restatement of the claim language without specific direction within the reference as to where each and every element arranged as claimed may be found, does not in and of itself establish a

prima facie case of anticipation. Absent specific anticipatory disclosure in Barni of each and every element of the claimed invention arranged as in the claim, Barni cannot be anticipatory.

In view of the amendment and foregoing remarks, Applicant submits that Barni does not disclose each and every element of the claimed invention arranged as claimed and therefore cannot be anticipatory. Accordingly, Applicant respectfully submits that the Examiner's rejection under 35 U.S.C. §102(e) has been traversed, and requests that the Examiner reconsider and withdraw this rejection.

Rejections Under 35 U.S.C. §103(a)

Claims 2, 5, 10, 16 and 22 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Barni in view of General Electric Company (European Patent Application No. 1090586, hereinafter "EP 1090586").

Claims 8, 17 and 23 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Barni in view of Shao et al. (US Patent Application Publication No. 2003/0233039, hereinafter "Shao").

Claims 25 and 28 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Barni in view of Hu et al. (US Patent No. 6,073,041, hereinafter "Hu").

Applicant traverses these rejections for the following reasons.

In view of the secondary references being applied to reject dependent claims, and in view of Applicant's amendments set forth above with respect to the independent claims to clarify the scope of the claimed invention, Applicant submits that the secondary references fail to teach or suggest the limitations of the now amended claims, and for at least this reason Applicant submits that the combination of references applied to reject the noted claims for obviousness fail to establish a prima facie case of obviousness and therefore cannot be properly applied to reject the noted claims.

In addition to the foregoing, Applicant finds no motivation or teaching in any of the References to modify a primary Reference in view of its respective secondary Reference to arrive at the claimed arrangement of elements without disturbing the two temporal resolutions and intended purpose of the art being modified, namely Barni.

In view of the foregoing, Applicant submits that the References fail to teach or suggest each and every element of the claimed invention and are therefore wholly inadequate in their teaching of the claimed invention as a whole, fail to motivate one skilled in the art to do what the patent Applicant has done, fail to offer any reasonable expectation of success in combining the References to perform as the claimed invention performs, fail to teach a modification to prior art that does not render the prior art being modified unsatisfactory for its intended purpose, and discloses a substantially different invention from the claimed invention, and therefore cannot properly be used to establish a prima facie case of obviousness. Accordingly, Applicant respectfully requests reconsideration and withdrawal of all rejections under 35 U.S.C. §103(a), which Applicant considers to be traversed.

In light of the foregoing, Applicant respectfully submits that the Examiner's rejections under 35 U.S.C. §102(e) and 35 U.S.C. §103(a) have been traversed, and respectfully requests that the Examiner reconsider and withdraw these rejections.

Regarding Claims 30 and 31

Regarding Claim 30, Applicant submits that Claim 30 is allowable at least for the reason that it depends from an allowable parent claim.

Regarding Claim 31, Applicant submits that the Examiner has failed to establish a prima facie case of anticipation by failing to show where Barni discloses "operating said imaging system at multiple acquisition locations ***that correspond to each sub-target area***". In alleging anticipation, the Examiner cites Barni at col. 4, lines 25-42, col. 3, lines 11-30, and lines 40-58. However, in comparing Barni as cited to the claimed invention, Applicant finds Barni to disclose: triggering data acquisition at the same point in each of a series of consecutive cycles to achieve the first temporal resolution (col. 4, lines 25-42); an exemplary medical imaging system to acquire medical images of a region of interest (col. 3, lines 11-30); and, at least two medical images of the same region of interest, one at a relatively higher temporal resolution, and the other at a relatively lower temporal resolution (col. 3, lines 40-58), and to be completely absent any

disclosure of the claimed limitations arranged as claimed.

Accordingly, Applicant respectfully submits that the Examiner has fallen wholly short of showing where Barni clearly discloses each and every element of the claimed invention arranged as claimed.

If a communication with Applicant's Attorneys would assist in advancing this case to allowance, the Examiner is cordially invited to contact the undersigned so that any such issues may be promptly resolved.

The Commissioner is hereby authorized to charge any additional fees that may be required for this amendment, or credit any overpayment, to Deposit Account No. 07-0845.

In the event that an extension of time is required, or may be required in addition to that requested in a petition for extension of time, the Commissioner is requested to grant a petition for that extension of time that is required to make this response timely and is hereby authorized to charge any fee for such an extension of time or credit any overpayment for an extension of time to the above-identified Deposit Account.

Respectfully submitted,

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